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Why without Pay? The Intrinsic Motivation between Investment and Consumption in Unpaid Labour Supply

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Abstract

This paper provides a theoretical model and an empirical investigation on unpaid labour regularly supplied in non profit organisations. The contribution is threefold. First, intrinsic motivation in unpaid labour supply is considered, taking into account simultaneity between investment and consumption motives. Second, we study the impact of family care responsibilities on the determination of unpaid labour supply. Third, the specific activity a person is engaged in is shown to have a significant relevance. Empirical analysis, on data from *Indagine Multiscopo sulle Famiglie, Aspetti della Vita Quotidiana*, 1997, shows that frequently supplied unpaid labour depends on intrinsic motivation, income, age, family responsibilities and the specific task carried out in non profit organisations. The analytical framework suggests that these determinants support the hypothesis that both investment and consumption motives interact in shaping unpaid labour supply, with a stronger impact of consumption purposes.

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Introduction

A growing share of unpaid labour supply characterises advanced economies, especially in the sectors related to education, health and social services. In Italy, in the late nineties, the non profit sector was 3,1 percent of the whole economy, with 2,3 percent of total employment. Three million workers were employed in non profit activities at zero wage, about one third of them were in activities concerning education, health and social services (Beraldo, Turati 2007).

Many studies have attempted to explain unpaid labour supply using two approaches: one based on a consumption hypothesis, the other on an investment perspective. In the private consumption model, volunteers are motivated to give by itself, as in the "warm glow" literature (cfr. Andreoni 1990). In the investment approach, volunteering improves human capital, increases employability and future income (Menchik, Weisbrod 1987). Though empirical evidence often supports both approaches, theoretical models do not consider the two motives simultaneously. Furthermore, few studies use a social preferences framework to analyse unpaid labour supply. According to Fehr and Fishbaker (2002), a person exhibits a social preference system if he cares not only about his own welfare but about that of others too. Social preferences have been classified as a category of intrinsic motivation (Meier, Stutzer 2008), which occurs when people engage in an activity, with no other external incentive than the activity itself (Deci, 1971).

The paper provides a theoretical model and an empirical investigation on unpaid labour regularly supplied in non profit organisations. In the theoretical analysis, both the consumption and investment purposes are simultaneously considered in order to investigate the role of intrinsic motivation. The family needs of care are also introduced. Empirical evidence, based on the dataset Indagine Multiscopo sulle Famiglie, Aspetti della Vita Quotidiana, ISTAT, for 1997, shows that intrinsic motivation, income, age and household care are significant variables, influencing the probability of regularly supplying unpaid labour. Moreover, as already suggested by Freeman (1997, S158), the activity sector in which one exerts unpaid labour is also a relevant variable.

In the first section, literature about volunteering is resumed, while, in section 2, the theoretical model is described. After a brief presentation of the data set (§3), sections 4 and 5 contain econometric strategy and main results, then discussed in paragraph 6.

1. Literature Review

Evidence on unpaid labour supply are not always decisive on some issues. Volunteering can be conceived either as consumption or investment good: income and age are thought to be relevant to distinguish one from the other. Where income is concerned, Menchik, Weisbrod (1987), Day and Devlin

(1996) and Vaillancourt (1994) show that a consumption motive exists. The same occurs for Italian data in Fiorillo (2009). Searching for a life cycle pattern in volunteering decisions, Menchik, Weisbrod (1987), Day and Devlin (1996), Vaillancourt (1994), and Fiorillo (2009) find that age has a significant impact on the probability to engage in unpaid work, supporting the investment model. The opposite occurs in Brown and Lankford (1992). Two recent papers investigate the problem arising from the potential simultaneity between investment and consumption. Prouteau and Wolff (2006) find some evidences for the consumption model in a French volunteers' dataset, but they refer only to volunteers with positions of responsibility. Hackl et al. (2007), using Austrian data, give stronger support to the investment hypothesis, for employed sole wage earners. Though accounting for potential simultaneity in empirical investigation, both papers do not supply a simultaneous theoretical analysis.

Cappellari, Turati (2004) and Cappellari et al. (2007) explicitly introduce intrinsic motivation among variables influencing volunteers' behaviour. With data referred to Italian volunteers, they show that their proxy of intrinsic motivation has a significant impact on time donations. These analysis are restricted to the consumption behaviour. Meier e Stutzer (2008) analyse the relation between life satisfaction and volunteering. They find that both intrinsic and extrinsic motivations explain unpaid labour supply, but only intrinsic motivation has a positive impact on life satisfaction. Authors suggest that "more research is needed in order to better understand which volunteer tasks are most rewarding and how such differences can be explained" (Meier, Stutzer 2008, 55).

Some papers focus on female volunteers who generally participate in non profit activities more than men. Carlin (2001), Mueller (1975), Schram and Dunsing (1981) show ambiguous results on the relevance of consumption and investment motivations in unpaid female labour supply, using data from US. Some relevant variables could be omitted in both empirical and theorical investigation, when coping with female behaviour. In particular, the female propension to take on household duties could justify different choices in volunteer labour. The presence of young children or elderly needing care, influences the amount of voluntary labour supplied (Taniguchi 2006) because the need for care within the family modifies the opportunity set available to the volunteer (Cappellari et al 2007). Freeman (1997) shows that volunteers have individual characteristics correlated with a higher opportunity cost of time, with respect to the choice whether to volunteer or not, and how many hours to supply: they are characterised by higher hourly wages, income, age and education. Economic rationale explaining this evidence is that: "volunteers do very different things […] Perhaps differences in the productivity of time spent in voluntary activities can help identify supply responsiveness in volunteering" (Freeman, 1997, S158). The specific activity sector one is engaged in could be quite important for female volunteers, because the typical non profit sectors (health, education and social services) generally have a higher share of female employment, also in the profit sector. Menchik and Weisbrod (1987) include the activity sectors in their analysis but Banks and Tanner (1998) show that these variables weaken the relation between wage and working

hours supplied. The latter evidence suggests that volunteers take their volunteering choices, based on the ability to bear the associated cost, which can be different from sector to sector (Govekar, Govekar 2002).

Time devoted to unpaid work is subtracted from work or leisure. The working status could be relevant to determine the probability of volunteering and the amount of hours supplied (Taniguchi, 2006). Differences between the employed and unemployed have been underlined by Apinunmahakul et al. (2008) in a framework of simultaneous money and time donations: the family size is significant for employed people and not significant for unemployed ones. Authors suggest the existence of a less tightening time constraint for the unemployed.

Summing up, more research is needed about the implications of overlapping motivations of consumption and investment, taking into account the role of intrinsic motivation. Moreover, household duties, working status and the activity sector could help to explain the behaviour of volunteers.

2. The Model

Following the classification of Meier and Stutzer (2008), people may volunteer for intrinsic reasons (social preferences, work enjoyment) and/or for extrinsic reasons (human capital and social network investment); these motivations may affect the degree of satisfaction generated by the activity itself. While consumption choices are driven by intrinsic motivation (the purpose is to consume those specific goods), investment choices are driven by extrinsic motivation (instrumental).

The agent maximises a two period utility function. In each period the available leisure is allocated among activities for his own satisfaction (TMt) and "other regarding" activities (TYt). Two kinds of "other regarding" activities can be distinguished: time spent outside the family, supplying unpaid work, like in volunteer work[1] (TYte) and time spent taking care of family members (TYti).

Family needs are described by a household care constraint, whose parameters depend on family size, its composition and the age of its members. If h be the time needed for family caring, considering that one can purchase care services at a price b, the family's expenditure is given by $b\left(h - TY_{ti}\right)$.

Intrinsic motivation to engage in activities bearing the satisfaction of others (α) has two components, with α=βγ. β denotes the relative weight, in the agent utility, of spending time for the satisfaction of others compared to the time spent for one's own satisfaction; γ is the weight of the consumption motivation compared to the investment one (1-γ). If γ>0, time spent in other regarding activities will be an argument of utility function, and if γ=1, the agent will be driven only by consumption motivation. On the contrary, if time spent in

[1] In what follows unpaid labour and volunteering will be used as synonymous.

other regarding activities is instrumental to income maximisation, gaining more private goods, the agent will be driven only by investment motivation. Therefore, γ=0 and the agent supplies unpaid work because he has an expectation of a higher income, coming from activities he performed in the previous period. E(rt) is the wage increase expectation, resulting from unpaid work supplied in the first period, with rt=f(TYt-1,e) and f(TYt-1,e). The investment returns function rt depends on time spent in other regarding activities in the first period, according to a parameter k>1, varying with investment productivity, which in turn will depend on how much the agent's skills will match the specific activity sector he is engaged in. Therefore, (TYt-1,e)=kTY0,e/Tx.

With an intertemporal Cobb Douglas function, agent utility is described by (1).

$$U = \prod_t \left[(C_t TM_t)^{1-\beta\gamma} (TY_t)^{\beta\gamma} \right]^{\delta^t} \quad (1)$$

s.t.

$$\sum_t \delta^t (C_t + b(h - TY_{ti})) = \sum_t \delta^t \left[wE(r_t)\left(TX - TY_t - TM_t\right) + X \right] \quad (2)$$

where Tx is maximum available time, X is non labour income, w the wage, δ individual discount factor.

In this framework, we can test the implication of three different hypotheses: if γ=0, the agent will engage in TY just for investment motivations; when γ=1 the agent supplies unpaid work only for consumption motives, while if 0<γ<1 both investment and consumption motivations address individual behaviour. The main assumptions are the following:

Assumption 1: $TY_t = \sum_j TY_{t,j}$, with j=i,e.

Assumption 2: E(r) depends on individual motivation: the agent will expect rt=0 with probability γ and rt=f(TYt-1,e) with probability 1- γ. As a consequence, E(rt) =(1-γ)f(TYt-1,e).

Assumption 1 implies that, if intrinsic motivation holds, the utility function depends on the time spent carrying out household duties, and on the time used for other regarding activities. Furthermore, referring to individual utility, the two categories of time use are perfectly substitutable.

Assumption 2 states that the extrinsic motivation determines the subjective probability of higher earnings resulting from unpaid work. The intrinsic motivation represents the subjective probability that no further return will derive from unpaid work.

Utility maximisation implies a different first order condition according to value γ. In more detail, if γ=1 the pure consumption model implies that:

$$TY_{0e} = \frac{\beta\left(wT_x + X\right)}{\left(2-\beta\right)w} - h \quad (3)$$

with $\frac{\partial TY_{0e}}{\partial \beta} > 0; \quad \frac{\partial TY_{0e}}{\partial X} > 0; \quad \frac{\partial TY_{0e}}{\partial w} < 0; \quad \frac{\partial TY_{0e}}{\partial h} < 0;$

The equilibrium amount of other regarding activities in a pure consumption model depends on total income, household duties and intrinsic motivation.

When γ=0, the agent will engage in volunteering activities just for investment purposes and the optimal value for TY0,e comes from second period income maximisation. The marginal cost of unpaid labour must be equal to the discounted value of the marginal benefits it is expected to bring.[2]

$$TY_{0e} = \frac{(1+\delta)\left[\delta\left(X - bh\right) - \frac{wT_x(\delta k - 2)}{k}\right]}{(2+\delta)w(\delta k - 1)} \quad (4)$$

In the pure investment model, unpaid labour supply does not depend on intrinsic motivation and it varies with discount factor. In particular, with the same investment productivity (k), an higher discount factor will reduce the unpaid labour supply. More regular unpaid activity (in comparison with an infrequent one) is associated with higher age[3].

By comparing the pure consumption and the pure investment model, one can affirm that if unpaid labour supply is directed only by investment purposes, it will vary with age and is independent from intrinsic motivation; on the contrary, if a pure consumption model occurs, the choice of how much to volunteer will not depend on age and the intrinsic motivation has a positive impact on it.

In the model with simultaneous consumption and investment purposes (0<γ<1), the solution depends on the relative strength of the investment motivation (1-γ).

If $1-\gamma \leq \frac{b}{\delta k w}$ the optimal unpaid labour supply will derive from a corner solution, because the opportunity cost associated to time devoted to home life is strictly lower than the opportunity cost of volunteer work, performed outside the family. In other words, if the intrinsic motivation is sufficiently high, in the mixed model the consumption motive will prevail and the optimal unpaid labour supply is given by:

$$TY_{0e} = \frac{\beta\gamma\left[\left(wT_x + X\right)\left(1+\delta\right) - \delta k w(1-\gamma)h\right]}{(1+\delta)(2-\beta\gamma)w(1-\delta k(1-\gamma))} - h \quad (5)$$

where $\frac{\partial TY_{0e}}{\partial \delta} > 0$.

[2] The first order condition for unpaid activities implies $\delta k / T_x\left[T_x - TM_1\right] = 1$

[3] With the same investment productivity, people with higher discount factor spend less time in unpaid work, obtaining the same second period earnings of people with a lower discount factor.

If $1-\gamma > \frac{b}{\delta kw}$ the agent will choose unpaid labour supply in order to equate the marginal benefit deriving from investing in volunteering and the cost of care services he economizes by supplying home care by himself. With high extrinsic motivation, the investment purpose will prevail and from the condition $\delta kw(1-\gamma)/T_x\left[T_x - TM_1\right] = b$, the resulting optimal unpaid labour supply is:

$$TY_{0e} = \frac{\delta\left[X(1+\delta) + wT_x - bh + bT_x / k(1-\gamma)\right]}{\left[2+\delta-\beta\gamma\left(1+\delta\right)\right]\left[\delta kw(1-\gamma) - b\right]} - \frac{T_x}{k\left(1-\gamma\right)} \qquad (6)$$

Summing up the results of the mixed model, one can say that if the consumption purpose prevails, unpaid labour supply will depend positively on intrinsic motivation and negatively on age.

The above results derive from the hypothesis that the reference agent actively participates in the labour market. For those outside the labour force, the investment purpose could be evaluated with the hypothesis that the agent is expected to work in the second period. Quite similar to (6) is the optimal value of unpaid labour supply resulting from an higher value of extrinsic motivation, while with high intrinsic motivation it is independent of discount factor, wage and non labour income (TY0,e=βγTx-h(1+βγ)). For those outside the labour force, in fact, time devoted to other regarding activities has no opportunity cost.

Finally, it is worthwhile to underline the role of investment productivity k. Comparing the alternative hypothesis on volunteer behaviour, it emerges that the k impact on unpaid labour supply is zero if γ=1 (pure consumption), negative if γ=0 (pure investment) or if 0<γ<1 with a relatively low γ (investment prevailing on consumption purposes), positive if 0<γ<1 with a relatively high γ (consumption purposes prevailing). The rationale for these results is that more productive labour increases the available consumption, only if the investment returns are taken into account, but only if investment objectives are taken into account (and if the investment prevails consumption), ceteris paribus, more productive work needs devoting less time to gain the same return. Different values of k, involving different investment productivity, are associated to the specific task undertaken in non profit organizations. Different activity sectors can have a role in unpaid labour supply.

3. Data

To test the different implications of consumption and investment purposes in determining unpaid labour supply, we use data from Indagine Multiscopo sulle Famiglie, Aspetti della Vita quotidiana, Istituto Nazionale di Statistica, for the year 1997. This wave contains a section, for those over thirteen years of age, supplying unpaid labour in non profit organisations in the last 12 months.

In this section information is available about attendance of unpaid work, useful for the analysis of volunteering intensity for those who participate in the unpaid labour market. In particular, data concerning social and economic characteristics of the volunteers are used. The volunteers sample (4597 individuals) is divided in two subsamples: labour force (2667 individuals) and non labour force (1928 individuals). The selection of variables is based on existing literature on volunteering and social capital, and on previous theoretical analysis. Table 1 gives the name and definition of variables used in the econometric analysis, and Table 2 shows the descriptive statistics for both the subsamples.

The dependent variable is based on a question about unpaid work attendance: the "frequent volunteering" dummy has value 1 if the respondent has selected the answers "once a week" and/or "more than once a week", 0 for answers "once a month or more" and "more rarely". Table 2 shows that, on average, 43 percent of the labour force and 32 percent of non labour force frequently supply unpaid labour.

As regards independent variables, the analysis uses data supposed to be relevant in determining frequent volunteering, according to the previous discussions. As a proxy for intrinsic motivation, the answers to the multiple choice question *"Why did you choose to collaborate with an association or volunteering group?"* have been used. The dummy for intrinsic motivation is equal to 1 for respondents indicating "it's a value by itself", 0 otherwise. Average values in Table 2 indicate that 22 percent of frequent volunteers selected this motivation, both in and outside the labour force. As proxy for household duties (Table 1), questions regarding the family size, the age of children and the use of family services have been used. In Table 2, the two subsamples show differences just for dummies regarding the age of children.

Data contained in Multiscopo survey supply information about the specific activity carried out in the non profit organisation. Four dummies of activity, described in Table 1, have been included in the analysis. The aim is to understand if the specific activity sector (education, health care, social services or generic help) plays a role in an unpaid labour setting, if regularly supplied. Differences between the two subsamples are negligible, except for the variable of generic help (Table 2).

Multiscopo survey contains data on total monthly family income, classified in sixteen intervals. Following Freeman (1997), we used the average of each interval as a measure of total family income. Finally, five dummies for the age of respondents are described in Table 1. Table 2 underlines small differences for total income in the two subsamples and many more for the dummies of age. In particular, in the labour force the most numerous group is aged 35-44, while in the non labour force this is the reference group (aged 14-24).

Variable	Description
Dependent variable	
"Frequent" volunteering	Dummy, 1 if unpaid activity for official volunteer service associations one or more times per week ; 0 otherwise
Personal characteristics	
Female	Dummy, 1 if female; 0 otherwise
Married	Dummy, 1 if married ; 0 otherwise
Age14-24	Dummy, 1 if age is between 14 and 24 years; 0 otherwise. Reference group
Age25-34	Dummy, 1 if age is between 25 and 34 years; 0 otherwise
Age35-44	Dummy, 1 if age is between 35 and 44 years; 0 otherwise.
Age45-54	Dummy, 1 if age is between 45 and 54 years; 0 otherwise
Age55-64	Dummy, 1 if age is between 55 e 64 years; 0 otherwise
Age>64	Dummy, 1 if age is equal to 65 and above; 0 otherwise
Primary school	Dummy, 1 if primary school; 0 otherwise
Junior High school	Dummy, 1 if compulsory education, 0 otherwise
High school	Dummy, 1 if high school graduates, 0 otherwise.
University	Dummy, 1 if university degree and doctorate, 0 otherwise. Reference group
Ln(FI)	Natural logarithm of total monthly household income obtained by taking the average of categories
Employee	Dummy, 1 if individual is employed as an employee, 0 otherwise. Reference group
Entrepreneur	Dummy, 1 if individual is employed as an entrepreneur , 0 otherwise
Self-employed	Dummy, 1 if individual is employed as a self-employed, 0 otherwise
Private services	Dummy, 1 if individual is employed in the private sector; 0 otherwise
Intrinsic motivation	Dummy, 1 if volunteer is "a value per se", 0 otherwise
Family duties	
Family composition	Number of people who live in family
Children0_5	Dummy, 1 if the number of children is aged between 0 and 5 years; 0 otherwise
Children6_15	Dummy, 1 if the number of children is aged between 6 and 15years; 0 otherwise
Personal services	Dummy, 1 if the family takes advantage of baby sitter and / or person to assist elderly, 0 otherwise
Volunteer activities	
Education	Dummy, 1 if volunteer performs unpaid labour in the activity of education, 0 otherwise
Health care	Dummy, 1 if volunteer performs unpaid labour in the activities of nursing, therapeutic and health care; 0 otherwise
Social services	Dummy, 1 if volunteer performs unpaid labour in the activities of services of social rehabilitation and/or listening, reception, private consultations, 0 otherwise
General help	Dummy, 1 if volunteer performs unpaid labour in the activity of general help., 0 otherwise
Other independent variables	
Good health	Dummy, 1 if individual sees himself in a good state of health; 0 otherwise
Homeowner	Dummy, 1 if individual owns the house where he lives; 0 otherwise
Churchgoer	Dummy, 1 if individual goes to church at least once a week; 0 otherwise
Newspapers	Dummy, 1 if individual reads newspapers every day of the week; 0 otherwise
Thefts	Dummy, 1 if individual has suffered thefts; 0 otherwise
Pickpockets	Dummy, 1 if individual has suffered pickpockets; 0 otherwise
Parking	Dummy, 1 if individual declares that there is not difficulty in parking in the area where he lives; 0 otherwise
Traffic	Dummy, 1 if individual declares that there is not traffic in the area where he lives; 0 otherwise
Pollution	Dummy, 1 if individual declares that there is not pollution in the area where he lives; 0 otherwise

Table 1: variables description

Variable	Labour force			Non labour force		
	Obs	Mean	Std. Dev	Obs	Mean	Std. Dev
“Frequent” volunteering	2669	0.32	0.47	1928	0.43	0.49
Female	2669	0.36	0.48	1928	0.59	0.49
Married	2669	0.61	0.49	1928	0.50	0.50
Age14-24	2699	0.11	0.31	1928	0.31	0.46
Age25-34	2669	0.28	0.45	1928	0.09	0.29
Age35-44	2669	0.31	0.46	1928	0.09	0.28
Age45-54	2669	0.22	0.42	1928	0.16	0.37
Age55-64	2669	0.06	0.24	1928	0.19	0.40
Age>64	2669	0.01	0.07	1928	0.14	0.35
Primary school	2669	0.07	0.26	1928	0.23	0.42
Junior high school	2669	0.30	0.46	1928	0.35	0.48
High school	2669	0.47	0.50	1928	0.35	0.48
Ln(FI)	2588	14.88	0.50	1874	14.78	0.54
Entrepreneur	2669	0.19	0.39			
Self-employed	2669	0.05	0.21			
Private services	2669	0.32	0.47			
Intrinsic motivation	2669	0.22	0.42	1928	0.22	0.42
Family composition	2669	3.45	1.21	1928	3.40	1.27
Children0_5	2669	0.17	0.45	1928	0.06	0.27
Children6_15	2669	0.46	0.73	1928	0.33	0.66
Personal services	2627	0.03	0.17	1875	0.02	0.13
Education	2669	0.11	0.31	1928	0.10	0.29
Health care	2669	0.07	0.25	1928	0.06	0.24
Social services	2669	0.05	0.23	1928	0.06	0.23
General help	2669	0.15	0.35	1928	0.27	0.44
Good health	2645	0.51	0.50	1913	0.46	0.50
Homeowner	2660	0.74	0.44	1919	0.81	0.39
Churchgoer	2662	0.31	0.46	1921	0.36	0.48
Newspapers	2663	0.38	0.48	1922	0.30	0.46
Thefts	2669	0.01	0.22	1928	0.01	0.12
Pickpockets	2669	0.02	0.16	1928	0.02	0.15
Parking	2658	0.49	0.50	1921	0.46	0.50
Traffic	2652	0.29	0.45	1913	0.27	0.44
Pollution	2660	0.33	0.47	1921	0.31	0.46

Table 2: descriptive statistics

4. Econometric Strategy

In this section, we test the theoretical results of section 2 with the following econometric strategy. V_i^* is the "latent variable" measuring utility coming from unpaid labour frequently supplied to non profit organisations.

$$V_i^* = \boldsymbol{X_i\beta} + \boldsymbol{I_i}\,\boldsymbol{\delta_1} + \boldsymbol{F_i\gamma} + \boldsymbol{R_i\lambda} + e_i \qquad (7)$$

where i = 1… N, $\boldsymbol{X_i}$ is the individual characteristics vector, $\boldsymbol{I_i}$ is intrinsic motivation dummy, $\boldsymbol{F_i}$ the vector representing household characteristics, $\boldsymbol{R_i}$ the regional dummies, e_i the error and $\boldsymbol{\beta}, \boldsymbol{\delta_1}, \boldsymbol{\gamma}, \boldsymbol{\lambda}$ vectors are parameters. If V_i is the observed variable, including those who frequently supply unpaid labour, then

$$V_i = 1 \text{ if } \boldsymbol{U_R} > \boldsymbol{U_{NR}} \qquad (8)$$
$$V_i = 0 \text{ if } \boldsymbol{U_R} \leq \boldsymbol{U_{NR}}$$

From (7) and (8), assuming that e_i has a normal standard distribution, the following Probit model results as

$$\text{Prob(Vi=1)} = \Phi(\boldsymbol{X_i\beta} + \boldsymbol{I_i}\,\boldsymbol{\delta_1} + \boldsymbol{F_i\gamma} + \boldsymbol{R_i\lambda}) \qquad (9)$$

where $\Phi(\cdot)$ is the cumulative distribution function of a normal standard. In what follows, estimated results of parameters in (9) are discussed, for the two subsamples.

Labour force

Table 3 shows the Probit equation (9) results for labour force. Parameter estimations are Probit marginal effects calculated on sample means of independent variables, while standard errors (in parenthesis) are corrected for heteroskedasticity and residual clustering at a regional level. Usual notation (*) denotes significance level. For brevity, we report marginal effects only for the principal variables[4].

First of all, intrinsic motivation influences the probability of volunteering once or more a week in the expected direction. The marginal effect of the intrinsic motivation variable has a positive sign and is more or less stable in both columns of Table 3 and is significant at 1 percent. The respondents who indicate that volunteering is "a value by itself" probably supply more frequently unpaid labour than the ones reporting other motivations. These results reject

[4] All the results are available on demand.

the hypothesis that only investment purposes determine unpaid labour supply. Where other variables are concerned, theoretical analysis implies a positive effect of non labour income and a negative effect for wage. Estimates reported in Table 3 indicate that total familiar income has a negative sign, significant at 5 percent (column 2). The result could be induced by a prevailing substitution effect, due to labour income, on the income effect, due to non labour income. The marginal effects of education dummies, though not significant, seem to confirm this conclusion. Table 3 shows that higher education will reduce the probability of volunteering once or more a week. Considering education as a wage proxy, this would imply that with a higher wage (higher opportunity costs) less frequent volunteering will appear.

Variables	I		II	
Female	0.035**	(0.016)	0.033**	(0.015)
Married	-0.020	(0.027)	0.012	(0.030)
Age25-34	-0.052*	(0.027)	-0.033	(0.030)
Age35-44	-0.086*	(0.049)	-0.062	(0.053)
Age45-54	-0.074*	(0.044)	-0.076	(0.047)
Age55-64	-0.158***	(0.046)	-0.165***	(0.046)
Age>64	-0.256**	(0.064)	-0.256**	(0.066)
Primary school	0.021	(0.056)	-0.006	(0.053)
Junior high school	-0.003	(0.039)	-0.022	(0.038)
High school	- 0.016	(0.030)	-0.028	(0.030)
Ln(FI)	-0.038*	(0.022)	-0.054**	(0.021)
Entrepreneur	-0.075***	(0.025)	-0.077***	(0.025)
Self-employed	0.023	(0.064)	0.030	(0.065)
Private services	0.010	(0.019)	0.011	(0.020)
Intrinsic motivation	0.111***	(0.016)	0.110***	(0.017)
Family composition			0.020**	(0.010)
Children0_5			-0.083***	(0.022)
Children6_15			-0.031**	(0.015)
Personal services			-0.129***	(0.035)
Regional dummies	SI		SI	
Obs	2531		2500	
Pseudo R2	0.03		0.04	
Log L.hood	-1536.34		-1509.70	
Observed P	0.32		0.32	
Predicted P	0.32		0.32	

Table 3: marginal effects of the probability of being a frequent volunteer – Labour force

*Notes: the dependent variable is equal to one if the individual has done unpaid labour one or more times per week for official volunteer service associations over the last twelve months. The regressors are those given in Table 1. The coefficients are marginal effects calculated at the sample mean of independent variables. The standard errors reported in parentheses are corrected for heteroskedasticity and clustering of errors at the regional level. The symbols ***, **, * denote that the coefficient is statistically different from zero at the 1, 5 and 10 percent.*

Variables regarding family characteristics present marginal effects with expected sign and significance, except for family size: for dummies Children0_5 and Children6_15 the sign is negative and significant, as expected; for the family size variable the marginal effect is positive and significant. People with children aged 0 and 15, less frequently supply volunteer activity than those without small kids or teenagers, and this evidence can be associated to the need to accomplish care tasks. In the same way, people purchasing care services, less frequently supply volunteer activity: care services variable captures the needs relative to the elderly, beside those of kids. The sign thus confirms the inverse relation between unpaid labour and tasks related to family care. Two different reasons could explain the positive sign of the variable representing the family size: on the one hand, not ever a numerous family implies more household tasks, as the latter is linked to the presence of kids or elderly; on the other hand, relatives could have a role in promoting volunteering, as literature has pointed out. Finally, estimates show a negative marginal effect, significant at 1 percent, of entrepreneur status but not for other self employed.

Age dummies show an inverse relation with the probability of undertaking frequent volunteering. The dummies referred to people aged over 55 have a negative and significant marginal effect, showing that people over 55 years of age less frequently supply unpaid labour than the reference group (aged 14 and 24). The age dummies relevance tends to reject the pure consumer model.

Summing up, the evidence shown in Table 3 confirms a mixed model of investment and consumption, for people frequently supplying unpaid labour. Furthermore, the inverse relation between age and volunteering supports that consumption purposes prevail on the investment ones.

Non labour force

The marginal effects of parameters of frequent volunteering equation are shown in Table 4. As for labour force, the intrinsic motivation has a positive marginal effect, significant at 1 percent. People outside the labour force significantly supply more frequent unpaid labour if intrinsically motivated than people giving different motivations. This evidence rejects the pure investment model also for the non labour force.

Total income is not significant for the probability of being a frequent volunteer. As shown by the theoretical implications, if consumption prevails on investment, volunteering does not depend on labour income. A model of overlapping consumption and investment seems to be prevalent, characterised by high intrinsic motivation (consumption prevailing on investment) or a pure consumption model. Age dummies, in fact, present an ambiguous relation with volunteering: people aged 25 and 34 less frequently volunteer than those aged 14 and 24; people over 55 do significantly more unpaid and frequent labour than the reference group. Other causal relations

must be at work, in the sub sample of non labour force, which needs further investigation.

Finally, the probability of being a frequent volunteer increases with education: primary educated people do unpaid labour less frequently than graduated ones, while the opposite occurs in the labour force.

Evidence about education suggests that, failing the relation between education and the opportunity cost of volunteering, the positive externality of education could emerge (Day and Devlin 1996, 44). Total results support a consumption model for the non labour force.

Variables	I		II	
Female	0.052**	(0.023)	0.048**	(0.023)
Married	-0.019	(0.032)	-0.016	(0.033)
Age25-34	-0.100**	(0.047)	-0.092**	(0.046)
Age35-44	0.042	(0.047)	0.043	(0.042)
Age45-54	0.063*	(0.038)	0.061	(0.041)
Age55-64	0.091**	(0.036)	0.072**	(0.035)
Age>64	0.142***	(0.043)	0.130***	(0.045)
Primary school	-0.181***	(0.061)	-0.167**	(0.065)
Junior high school	-0.074*	(0.053)	-0.057	(0.054)
High school	- 0.009	(0.048)	0.008	(0.048)
Ln(FI)	-0.035	(0.026)	-0.016	(0.032)
Intrinsic motivation	0.112***	(0.024)	0.114***	(0.026)
Family composition			-0.014	(0.014)
Children0_5			-0.007	(0.048)
Children6_15			0.012	(0.024)
Personal services			-0.071	(0.1114)
Regional dummies	SI		SI	
Obs	1822		1777	
Pseudo R2	0.05		0.05	
Log L.hood	-1181.80		-1151.39	
Observed P	0.43		0.43	
Predicted P	0.43		0.43	

Table 4: marginal effects the probability of being a frequent volunteer - Non labour force

*Notes: the dependent variable is equal to one if the individual has done unpaid labour one or more times per week for official volunteer service associations over the last twelve months. The regressors are those given in Table 1. The coefficients are marginal effects calculated at the sample mean of independent variables. The standard errors reported in parentheses are corrected for heteroskedasticity and clustering of errors at the regional level. The symbols ***, **, * denote that the coefficient is statistically different from zero at the 1, 5 and 10 percent.*

5. Robustness Analysis

According to Freeman (1997), the standard theory of labour supply cannot explain the differences among volunteers with similar individual characteristics, based on the opportunity cost of volunteering. He pointed out that the specific activity the individual is engaged in could supply more exhaustive explanations. The specific activity one carries out could be relevant in granting opportunities to skilled workers and, at same time, for the non profit organisation, as it represents an instrument to attract skilled resources (Ranci, 2006). Theoretical reasoning presented in section 2 suggests that investment productivity should have a different impact, depending on the prevailing behavioural purpose. In more detail, if it is true that consumption prevails on investment, investment productivity will have a positive impact on volunteering, while in the other hypothesis the impact will be negative or zero. Regarding robustness analysis we introduce activities carried out in non profit organisations to test, on the one hand, if they have a significant impact on the probability to be a frequent volunteer; on the other hand, to verify if the previous results continue to hold. According to data availability, more skilled sectors (education, health, social services) will be introduced together with an unskilled sector of "generic help"[5]. Results for both subsamples are reported in Table 5.

In both subsamples, the inclusion of new variables does not basically modify estimates of intrinsic motivation impact: the marginal effect decreases but it is significant at 1 percent. The marginal effect of the dummy Age>64 is stable but with a lower significance, at 10 percent for the labour force subsample and 5 percent for non labour force. For variables regarding total income and family tasks, in the labour force subsample, we observe that both effects and significance are relatively stable (Table 3, column 2). The variables introduced show a positive marginal effect, significant at 1 percent, except for the dummy "generic help". If higher returns are associated to higher skilled sectors, the positive effect of the relative variables on volunteering will confirm that a mixed model with prevailing consumption occurs.

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[5] Formally, if $\boldsymbol{A_i}$ is the vector of activities carried out and $\boldsymbol{\rho}$ the associated coefficients vector, the Probit model will be

$Prob(V_i=1)=\Phi(\boldsymbol{X_i\beta} + \boldsymbol{I_i}\,\delta_1 + \boldsymbol{F_i\gamma} + \boldsymbol{A_i\rho} + \boldsymbol{R_i\lambda})$

Variables	Labour force		Non labour force	
Female	0.015	(0.015)	0.021	(0.023)
Married	0.011	(0.028)	-0.014	(0.030)
Age25-34	-0.034	(0.030)	-0.091*	(0.047)
Age35-44	-0.063	(0.050)	0.043	(0.040)
Age45-54	-0.068	(0.042)	0.049	(0.040)
Age55-64	-0.166***	(0.041)	0.078*	(0.039)
Age>64	-0.259*	(0.066)	0.128**	(0.047)
Primary school	0.047	(0.058)	-0.125*	(0.071)
Junior high school	0.026	(0.036)	-0.024	(0.061)
High school	0.001	(0.029)	0.012	(0.053)
Ln(FI)	-0.052**	(0.021)	-0.020	(0.035)
Entrepreneur	-0.076***	(0.025)		
Self-employed	0.033	(0.064)		
Private services	0.027	(0.024)		
Intrinsic motivation	0.090***	(0.017)	0.106***	(0.032)
Family composition	0.022**	(0.010)	-0.007	(0.016)
Children0_5	-0.080***	(0.019)	-0.014	(0.046)
Children6_15	-0.032**	(0.016)	0.007	(0.025)
Personal services	-0.123***	(0.037)	-0.039	(0.114)
Education	0.329***	(0.027)	0.337***	(0.041)
Health care	0.145***	(0.034)	0.311***	(0.046)
Social services	0.136***	(0.035)	0.217***	(0.061)
General help	0.025	(0.030)	0.080***	(0.026)
Regional dummies	SI		SI	
Obs	2500		1777	
Pseudo R2	0.08		0.10	
Log L.hood	-1445.32		-1088.49	
Observed P	0.32		0.43	
Predicted P	0.32		0.43	

Table 5: marginal effects of the probability of being a frequent volunteer: robustness analysis with activities dummies

*Notes: the dependent variable is equal to one if the individual has done unpaid labour one or more times per week for official volunteer service associations over the last twelve months. The regressors are those given in Table 1. The coefficients are marginal effects calculated at the sample mean of independent variables. The standard errors reported in parentheses are corrected for heteroskedasticity and clustering of errors at the regional level. The symbols ***, **, * denote that the coefficient is statistically different from zero at the 1, 5 and 10 percent.*

In both subsamples, the inclusion of new variables does not basically modify estimates of intrinsic motivation impact: the marginal effect decreases

but it is significant at 1 percent. The marginal effect of the dummy Age>64 is stable but with a lower significance, at 10 percent for the labour force subsample and 5 percent for non labour force. For variables regarding total income and family tasks, in the labour force subsample, we observe that both effects and significance are relatively stable (Table 3, column 2). The variables introduced show a positive marginal effect, significant at 1 percent, except for the dummy "generic help". If higher returns are associated to higher skilled sectors, the positive effect of the relative variables on volunteering will confirm that a mixed model with prevailing consumption occurs.

Regarding the non labour force sample, total income and family related tasks still have a marginal non significant effect, and the education dummy referred to primary education has a marginal decreasing effect, but still significant at 5 percent. Regarding the activity sectors, both skill intensive and unskilled sectors are significant. This result is quite different from the one we obtained for labour force. For non labour force it is difficult to discuss the impact of activity sectors, based on skill intensity, though the positive effect of activity sectors on volunteering probability supports a prevailing consumption model.

It is worthwhile to note that, by introducing the sector variables, the gender dummy is much less significant (Table 3 and 4). Of some interest is the coincidence between the activity sectors we introduced and the female employment distribution generally concentrated in these sectors.

6. Main Findings Discussion

Although the definition of intrinsic motivation is vague and there is no well-established literature about this issue, empirical analysis confirms an important role for intrinsic motivation in unpaid labour supply. From the theoretical point of view, this implies that a consumption purpose is at work in the volunteers' behaviour and that a pure investment model, which is independent from intrinsic motivation, is ruled out. Estimates in Table 5 show that, starting from the sample mean, with a standard deviation increase of intrinsic motivation variable, the frequent unpaid labour will increase by 3,8 percent, in the labour force, and 4,4 percent, in the non labour force.

The investment purpose has still a role, as the age of respondents is a significant variable influencing the probability of being a frequent volunteer. In the labour force sample, we find that a standard deviation increase of the variables Age55-64 and Age>64 will reduce frequent volunteering, respectively, by 4 and 1.8 percent. The inverse relation between age and volunteering supports a mixed model of investment and consumption, with prevailing consumption.

People with small kids or teenagers significantly supply less regular and unpaid work. In the labour force sample, with a standard deviation increase of each family related variable (Children0_5, Children6_15 and personal

services) we observe a decrease of volunteering probability by 8 percent (one fifth of sample mean).

Finally, data show a positive and straightforward impact of the activity sector where the volunteer work is carried out. Regular volunteering, for both subsamples, will increase by 10 percent if the standard deviation of educational activities increases, representing the biggest impact among all the regressors. The skill intensive sectors enhance frequebt volunteering because they provide higher investment returns and more consumption availability. Individuals pursuing both purposes will choose the sectors that could be adequate to improve their human capital. At the same time, if the consumption purpose prevails, the investment opportunities are taken into account to maximise both the overall consumption and the consumption of volunteering activities.

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